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(54) IMPROVEMENTS IN OR RELATING TO THE MANUFACTURE OF  
WHEEL RIMS

(71) We, ZIMMER ORTHOPAEDIC LIMITED, a British company, of 180 Brompton Road, London, SW3 1HN, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

According to the present invention, there is provided a method of manufacturing a wheel rim, including a step wherein a substantially planar, annular, sheet metal part is worked through substantially a right angle so that it becomes a substantially cylindrical, annular, sheet metal part.

In order that the invention may be clearly understood and readily carried into effect, reference will now be made, by way of example, to the drawings accompanying the Provisional Specification in which:—

Figure 1 illustrates a first stage in a method of manufacturing a wheel rim for a wheelchair,

Figure 2 shows a second stage in the method, Figure 2a being a front elevation of a sheet metal dish, and Figure 2b being a side elevation thereof,

Figure 3 illustrates a third stage in the method, Figure 3a showing a front elevation of the dish, and Figure 3b showing a side elevation thereof,

Figure 4 illustrates a fourth stage in the method, Figure 4a showing a front elevation of an annular, sheet metal part, and Figure 4b showing a vertical axial section therethrough, and

Figure 5 illustrates the wheel rim manufactured by the method, Figure 5a being a front elevation thereof, and Figure 5b being a vertical axial section therethrough.

Referring to Figure 1, sheet metal strip 1 of approximately  $\frac{1}{16}$  inch thick has punched therefrom a circular, sheet metal disc 2. The disc 2 is then deep drawn to produce a dish 3 shown in Figure 2. The dish 3 consists of a circular base part 4 and a cylindrical, annular, flange part 5

at the external periphery of the part 4. The part 5 is co-axial with and at right-angles to the part 4, and has of course been formed by working through a right-angle a planar, annular part of the disc 2. Then, as illustrated in Figure 3, the base part 4 is severed from the cylindrical, annular part 5 and discarded. The severing can be performed by punching-out the base part 4. A pressing operation is then performed on the part 5 to form at respective opposite ends thereof two outwardly directed shallow flanges 6 (see Figure 4). Then the flanges 6 are deepened by a further pressing operation and subsequently staggered holes 7 are drilled or punched through the part 5 to receive spokes (see Figure 5).

The method described above has the advantage of avoiding any necessity for a welding operation in the production of the wheel rim. Dispensing with any welding operation has the advantage of allowing closer tolerances to be achieved and of obviating the need to clean and grind a weld.

## WHAT WE CLAIM IS:—

1. A method of manufacturing a wheel rim, including a step wherein a substantially planar, annular, sheet metal part is worked through substantially a right-angle so that it becomes a substantially cylindrical, annular, sheet metal part.

2. A method as claimed in claim 1, wherein said substantially planar, annular, sheet metal part is worked through substantially a right-angle as aforesaid by deep drawing.

3. A method as claimed in claim 1 or 2, wherein said substantially planar, annular, sheet metal part is part of a circular sheet metal disc and said substantially cylindrical, annular sheet metal part is part of a cylindrical dish.

4. A method as claimed in claim 3, wherein said step is followed by another step in which the base part of said dish is severed from said substantially cylindrical, annular sheet metal part.

5. A method as claimed in claim 4, wherein said other step comprises punching-out said base part from said dish.
6. A method as claimed in claim 4 or 5, wherein said other step is followed by a further step in which said substantially cylindrical, annular, sheet metal part has its ends worked to form respective outwardly directed shallow flanges.
7. A method as claimed in claim 6, wherein said further step comprises a pressing operation to form said flanges.
8. A method as claimed in any of claims 3 to 7, wherein a preceding step, in which said circular sheet metal disc is punched from sheet metal, precedes the first-mentioned step.
9. A method of manufacturing a wheel rim, substantially as hereinbefore described with reference to the drawings accompanying the Provisional Specification.
10. A wheel rim manufactured by a method as claimed in any preceding claim.

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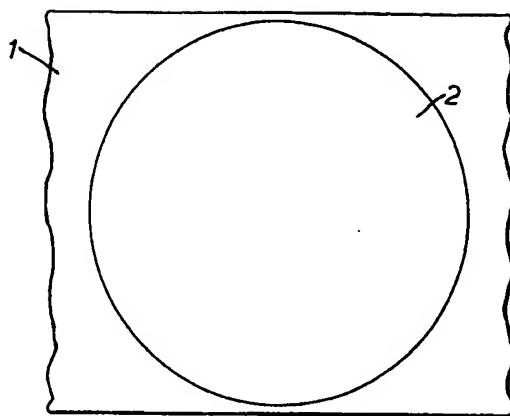


FIG. 1.

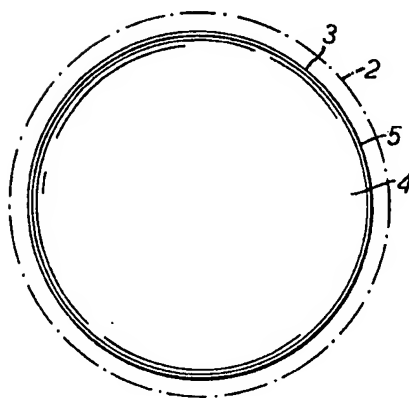


FIG. 2a.

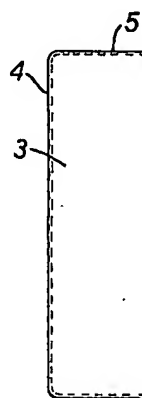


FIG. 2b.

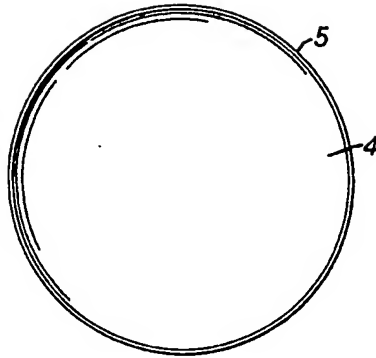


FIG. 3a.

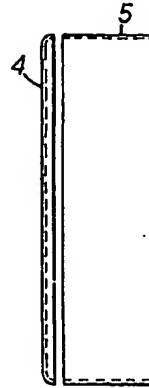


FIG. 3b.

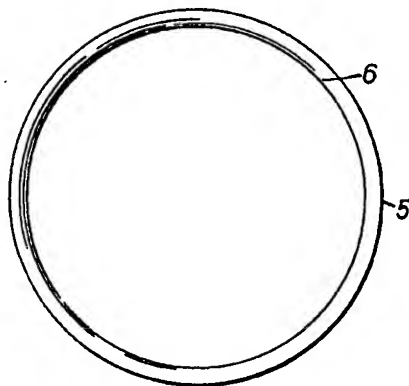


FIG. 4a.

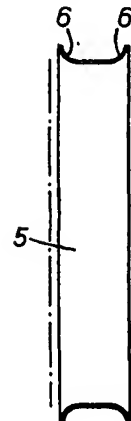
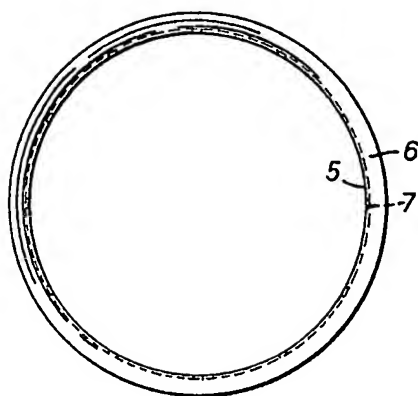
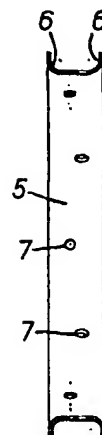


FIG. 4b.



*FIG. 5a.*



*FIG. 5b.*